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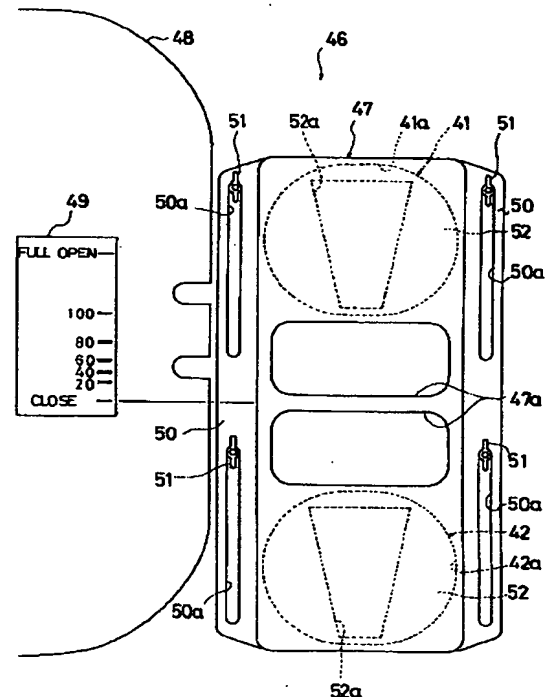
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(54)【発明の名称】 コンテナ用冷凍装置

(57)【要約】

【目的】スライド蓋のスライド移動量に対する換気量
の特性をリニアに近付けて、スライド蓋の開度調整を円滑
に行いかつ小換気量時の冷凍能力の低下を防止する。

【構成】庫内側ユニット(5)に、一端が庫外側に他端が
庫内側ファン上流側にそれぞれ開口する第2庫外空気導
入路(41)を介した庫外側導入口(41a)からの庫外空気導
入量と、一端が庫外側に他端が庫内側ファン下流側にそ
れぞれ開口する庫内空気導出路(42)を介した庫外側排出口
(42a)からの庫内空気排出量との相互量調整可能な換
気手段(46)を設ける。該換気手段(46)は、スライド蓋(4
7)を有し、スライド蓋(47)のスライド移動量当たりの庫
外側導入口(41a)および庫外側排出口(42a)の開口面積
の増加率を、スライド蓋(47)の開放側へのスライド移動
量が小さい小換気量時に共に小さくし、かつスライド蓋
(47)の開放側へのスライド移動量が大きい大換気量時に
共に大きく設定する。



【特許請求の範囲】

【請求項1】 コンテナボックス(1)の前面部に外面板(24)と内面板(20)とが併設され、該外面板(24)と内面板(20)との間には、ファン(10)によって庫内空気を循環させる空気通路(3a)が形成される一方、

上記外面板(24)には、一端が庫外側(B)に、他端が上記空気通路(3a)におけるファン(10)の上流側に開口する庫外空気導入路(41)と、一端が庫外側(B)に、他端が上記空気通路(3a)におけるファン(10)の下流側に開口する庫内空気導出路(42)と、上記庫外空気導入路(41)の庫外側導入口(41a)からの空気導入量および上記庫内空気導出路(42)の庫外側排出口(42a)からの空気排出量を調整するように該庫外側導入口(41a)と庫外側排出口(42a)とを開口面積可変に開閉するスライド蓋(47)を備えて庫内空気を換気する換気手段(46)が設けられ、

該換気手段(46)は、上記スライド蓋(47)の開放量が小さい小換気量時にはスライド移動量当たりの庫外側導入口(41a)および庫外側排出口(42a)の開口面積の増加率を共に小さくなる一方、スライド蓋(47)の開放量が大きい大換気量時にはスライド移動量当たりの庫外側導入口(41a)および庫外側排出口(42a)の開口面積の増加率を共に大きくするように構成されていることを特徴とするコンテナ用冷凍装置。

【請求項2】 換気手段(46)の庫外側導入口(41a)および庫外側排出口(42a)は、スライド蓋(47)の開放側へのスライド移動量当たりの庫外側導入口(41a)および庫外側排出口(42a)の開口面積の増加率が変化する開口形状に形成されていることを特徴とする請求項1記載のコンテナ用冷凍装置。

【請求項3】 換気手段(46)は、庫外側導入口(41a)および庫外側排出口(42a)にそれぞれ取付けられた開口(52a)を有する板体(52)の開口形状により、スライド蓋(47)の開放側へのスライド移動量当たりの庫外側導入口(41a)および庫外側排出口(42a)の開口面積の増加率が設定されるようにしていることを特徴とする請求項1記載のコンテナ用冷凍装置。

【請求項4】 開口形状は、少なくともスライド蓋(47)の反開放側略半分部の形状が略逆三角形に形成されるようにしていることを特徴とする請求項2または3記載のコンテナ用冷凍装置。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、例えば海上輸送用コンテナなど、コンテナ個々に設置するコンテナ用冷凍装置に関し、特に、生鮮物貯蔵用の冷凍コンテナに装着された冷凍装置に関する。

【0002】

【従来の技術】一般に、この種コンテナ用冷凍装置においては、ケーシングの正面板をコンテナボックスの庫内側に臨ませ、該正面板を除く各面板を庫外側に臨ませて

それぞれ配設し、該ケーシングをその上下方向略中間部に設けた仕切板によって上部の庫内側ユニットと下部の庫外側ユニットとに区画し、上記庫内側ユニットには冷凍装置(例えばホットガスバイパス方式)の冷媒回路の構成要素のうちの少なくとも蒸発器および該蒸発器に庫内空気を吹付けるための庫内側ファン(例えばブロベラファンなど)を収納する一方、上記庫外側ユニットには少なくとも凝縮器および該凝縮器に庫外空気を吹付けるための庫外側ファン並びに圧縮機を収納してなり、上記庫内側ファンによって、上記ケーシングに設けられた庫内側空気吹出口からの上記蒸発器で熱交換した庫内空気をケーシングに設けられた庫内側空気吹出口からコンテナボックス内に送給せしめるようにしている。そして、この場合、生鮮物の鮮度を保持するためには、その生鮮物の種類に応じた最適条件で保存することが必要である。例えば、生鮮物が青果物である場合には、低温障害が起こらない温度範囲(例えば摂氏0度〜20度付近の温度範囲)であることが要求される上、青果物などにあっては新陳代謝によりエチレングスを排出しているために庫内を換気することが要求されている。

【0003】そして、このような要求の元で、鮮度の低下が著しく早い青果物などを海外等の遠隔地へ輸送可能とする生鮮物輸送用のコンテナが注目されており、そのコンテナ用冷凍装置の従来のものとしては、例えば特開平3-36478号公報に開示されるように、庫内側ユニットに、一端が庫外側に開口し且つ他端が庫内側ファンの上流側に開口して庫外空気を庫内側ファンの上流側に導入する庫外空気導入路と、一端が庫外側に開口し且つ他端が庫内側ファンの下流側に開口して庫内空気を庫外に排出する庫内空気導出路とを設けるとともに、上記ケーシングの背面板に、上記庫外空気導入路の庫外側に開口する庫外側導入口から導入される庫外空気導入量と、上記庫内空気導出路の庫外側に開口する庫外側排出口から排出される庫内空気排出量との相互量の調整により庫内空気を換気する換気手段を設け、該換気手段は、ケーシングの背面板にスライド自在に支持された、庫外側導入口および庫外側排出口を開口面積可変に開閉させるスライド蓋を有し、このスライド蓋の開放側へのスライド移動により庫外側導入口および庫外側排出口を開口させて庫外空気と庫内空気との間に生じる差圧により、庫外空気導入路から流入させた湿度の高い庫外空気をケーシングに設けられた庫内側空気戻口からの庫内空気に混合させた後、この混合させた庫内空気(混合空気)のうち、一部を上記庫内空気導出路より庫外に排出して庫内空気を換気する一方、残る庫内空気をケーシングに設けられた庫内側空気吹出口からコンテナボックス内に送給せしめるようにしている。

【0004】この場合、庫外側導入口および庫外側排出口は円形状に形成され、該庫外側導入口および庫外側排出口をスライド蓋で開口面積可変に開閉させることによ

り、庫外側導入口から導入される庫外空気導入量と、庫外側排出口から排出される庫内空気排出量との相互量

(換気量)を調整するようにしている。すなわち、小換気量時にはスライド蓋の開放側へのスライド移動量を小さくする一方、大換気量時にはスライド移動量を大きくすることにより、生鮮物(特に青果物)などに応じて温度設定を行いつつ換気を行うようにしている。

【0005】

【発明が解決しようとする課題】このように、生鮮物のうちでも青果物のコンテナによる遠隔地への輸送には、その青果物の種類に応じた温度条件の設定に加えて換気を行う必要がある。そのため、上記従来のコンテナ用冷凍装置では、例えば輸送物がキウイフルーツなどの青果物である場合、このキウイフルーツの輸送条件、つまり庫内温度を摂氏0度程度に保持しつつ換気量を $20\text{ m}^3/\text{h}$ 程度に設定する条件が満たされるよう、スライド蓋の開放側へのスライド移動量を小さくする小換気量位置にて対応するようにしている。

【0006】ところが、上記従来のコンテナ用冷凍装置では、図8において仮想線(一点鎖線)で示すスライド蓋のスライド移動量に対する換気量の特性図のように、スライド蓋の開放側へのスライド移動量が小さいにも拘らず、換気量が著しく増大するという欠点を有している。

【0007】この要因としては、庫外空気導入路の庫外側導入口および庫内空気導出路の庫外側排出口が、内部に断熱材などを介在させた厚肉なケーシングの背面板を円形状に貫通して設けられているので、スライド蓋の開放側へのスライド移動量を小さくしても、上記庫外側導入口および庫外側排出口が円形状であるが故にスライド蓋のスライド移動量当たりの開口面積の増加率が共に大きくなり、この庫外側排出口からの庫内空気が庫外側排出口において開口する庫内側の貫通孔を斜めに過ぎて排出されるために庫外側排出口からの排出量(庫内空気排出量)が著しく増大する一方、これに伴い大きくなる、庫内側ファン上流側の庫内空気と庫外空気との間の差圧によって、庫外側導入口からの庫外空気導入量も自ずと増大し、換気量を増大させるからである。

【0008】このため、キウイフルーツなどの青果物の輸送条件に合致する小換気量時のスライド蓋の開放側へのスライド移動による庫外側導入口および庫外側排出口の開度調整(開口面積調整)が非常に困難なものとなる。

【0009】しかも、庫内温度を摂氏0度に保持したいにも拘らず、換気量が著しく増大すれば、冷凍装置への着霜により冷凍能力が低下するという欠点も有している。

【0010】本発明はかかる点に鑑みてなされたもので、その目的とするところは、換気手段を、スライド蓋のスライド移動量に対する換気量の特性がリニアに近付

くように改良して、スライド蓋のスライド移動による庫外側導入口および庫外側排出口の開度調整が円滑に行えるようにするとともに、小換気量時の冷凍装置への着霜による冷凍能力の低下を防止せんとするものである。

【0011】

【課題を解決するための手段】上記目的を達成するため、請求項1記載の発明が講じた解決手段は、コンテナボックス(1)の前面部に外面板(24)と内面板(20)とが併設され、該外面板(24)と内面板(20)との間には、ファン(10)によって庫内空気を循環させる空気通路(3a)が形成されている。そして、上記外面板(24)には、一端が庫外側(B)に、他端が上記空気通路(3a)におけるファン(10)の上流側に開口する庫外空気導入路(41)と、一端が庫外側(B)に、他端が上記空気通路(3a)におけるファン(10)の下流側に開口する庫内空気導出路(42)と、上記庫外空気導入路(41)の庫外側導入口(41a)からの空気導入量および上記庫内空気導出路(42)の庫外側排出口(42a)からの空気排出量を調整するように該庫外側導入口(41a)と庫外側排出口(42a)とを開口面積可変に開閉するスライド蓋(47)を備えて庫内空気を換気する換気手段(46)が設けられている。加えて、該換気手段(46)は、上記スライド蓋(47)の開放量が小さい小換気量時にはスライド移動量当たりの庫外側導入口(41a)および庫外側排出口(42a)の開口面積の増加率を共に小さくなる一方、上記スライド蓋(47)の開放量が大きい大換気量時にはスライド移動量当たりの庫外側導入口(41a)および庫外側排出口(42a)の開口面積の増加率を共に大きくなるように構成されたものである。

【0012】また、請求項2記載の発明が講じた手段

は、上記請求項1記載の発明の換気手段(46)を限定し、庫外側導入口(41a)および庫外側排出口(42a)は、スライド蓋(47)の開放側へのスライド移動量当たりの開口面積の増加率が変化する開口形状に形成された構成としている。

【0013】また、請求項3記載の発明が講じた手段

は、上記請求項1記載の発明の換気手段(46)を限定し、庫外側導入口(41a)および庫外側排出口(42a)にそれぞれ取付けられた開口(52a)を有する板体(52)の開口形状により、スライド蓋(47)の開放側へのスライド移動量当たりの開口面積の増加率が設定されるように構成している。

【0014】さらに、請求項4記載の発明が講じた手段は、上記請求項2または3記載の発明の開口形状を特定し、少なくともスライド蓋(47)の反開放側略半分部の形状を略逆三角形形状に形成する構成としている。

【0015】

【作用】上記の構成により、請求項1ないし4記載の発明では、コンテナボックス(1)内の輸送物が、庫内温度を摂氏0度程度に保持しつつ換気量を $20\text{ m}^3/\text{h}$ に設定することを要求するキウイフルーツなどの青果物であ

る場合、換気手段(46)のスライド蓋(47)は、開放側へのスライド移動量を小さくする小換気量位置にて庫外側導入口(41a) および庫外側排出口(42a) を小さく開口させて小換気量に対応させるようにしている。

【0016】その場合、スライド蓋(47)により開口される庫外側導入口(41a) および庫外側排出口(42a) の開口形状は、例えば少なくともスライド蓋(47)の反開放側略半分部の形状が略逆三角形形状に形成されて、小換気量時におけるスライド蓋(47)のスライド移動量当たりの庫外側導入口(41a) および庫外側排出口(42a) の開口面積の増加率が共に小さくなるように設定されているので、小換気量時に開放側へ小さくスライド移動量させたスライド蓋(47)と、庫外側排出口(42a) において開口する庫内側(A) の貫通孔を斜めに過ぎて排出される庫外側排出口(42a) との間からの庫内空気排出量が少なく抑えられる一方、ファン(10)上流側の庫内空気と庫外空気との間の差圧も小さく抑えられてスライド蓋(47)と庫外側導入口(41a)との間からの庫外空気導入量も自ずと減少し、小換気量条件下においてキウイフルーツなどの青果物のコンテナによる遠隔地への輸送が円滑になされることになる。

【0017】また、上記の如く庫外側導入口(41a) および庫外側排出口(42a) の開口形状が、少なくともスライド蓋(47)の反開放側略半分部の形状を略逆三角形形状に形成されて、大換気量時におけるスライド蓋(47)のスライド移動量当たりの庫外側導入口(41a) および庫外側排出口(42a) の開口面積の増加率が共に大きくなるように設定されているので、コンテナボックス(1) 内の輸送物が庫内温度を摂氏18度程度に保持しつつ換気量を大きく設定することを要求する球根などである場合、スライド蓋(47)は、開放側へのスライド移動量を大きくする大換気量位置にて庫外側導入口(41a) および庫外側排出口(42a) を大きく開口させて大換気量に対応させるようにしている。つまり、開放側へ大きくスライド移動量させたスライド蓋(47)により開口する庫外側排出口(42a) からの庫内空気排出量が多くなる一方、スライド蓋(47)と庫外側導入口(41a) との間からの庫外空気導入量も自ずと増加し、大換気量条件下において球根などのコンテナによる遠隔地への輸送が円滑になされることになる。

【0018】

【発明の効果】以上の如く、請求項1記載の発明におけるコンテナ用冷凍装置によれば、コンテナボックス(1) 内の輸送物に応じて換気手段(46)のスライド蓋(47)をスライド移動させることにより、小換気量時におけるスライド蓋(47)のスライド移動量当たりの庫外側導入口(41a) および庫外側排出口(42a) の開口面積の増加率を共に小さくする一方、大換気量時におけるスライド蓋(47)のスライド移動量当たりの庫外側導入口(41a) および庫外側排出口(42a) の開口面積の増加率を共に大きくするように設定して、スライド蓋(47)のスライド移動量に

する換気量の特性をリニアに近付くようにしたので、スライド蓋(47)のスライド移動による庫外側導入口(41a) および庫外側排出口(42a) の開度調整を円滑に行うことができる。しかも、換気量増大による小換気量時の冷凍装置(2) への着霜を防止して、冷凍装置(2) の冷凍能力の低下を防止することができる。

【0019】また、請求項2記載の発明におけるコンテナ用冷凍装置によれば、換気手段(46)によるスライド蓋(47)の開放側へのスライド移動量当たりの開口面積の増加率の設定を庫外側導入口(41a) および庫外側排出口(42a) の開口形状によって行うことにより、庫外側導入口(41a) および庫外側排出口(42a) の開口形状を変更するだけで、既存のスライド蓋を流用して換気手段(46)を構成することができ、安価な換気手段(46)を提供することができる。

【0020】また、請求項3記載の発明におけるコンテナ用冷凍装置によれば、換気手段(46)によるスライド蓋(47)の開放側へのスライド移動量当たりの開口面積の増加率の設定を、庫外側導入口(41a) および庫外側排出口(42a) にそれぞれ取付けた板体(52)の開口形状によって行うことにより、孔部(52a) を有する板体(52)を追加するだけで、既存の庫外側導入口および庫外側排出口並びにスライド蓋を流用して換気手段(46)を構成することができ、より安価な換気手段(46)を提供することができる。しかも、上記板体(52)の追加により換気手段(46)を構成していることから、既存のコンテナ用冷凍装置にも容易に適用することができ、既存のコンテナ用冷凍装置に対する換気手段(46)の汎用性を図ることができる。

【0021】さらに、請求項4記載の発明におけるコンテナ用冷凍装置によれば、庫外側導入口(41a) および庫外側排出口(42a) の開口形状又は庫外側導入口(41a) および庫外側排出口(42a) に取付ける板体(52)の開口(52a) の形状を、少なくともスライド蓋(47)の反開放側略半分部の形状が略逆三角形形状になるように形成していることにより、換気手段(46)を簡単かつ容易に構成することができる。

【0022】

【実施例】以下、本発明の実施例を図面に基づいて説明する。

【0023】図9ないし図11は本発明に係るコンテナ用冷凍装置の一実施例を示し、(1)はコンテナボックス、(2) は冷凍装置であって、該冷凍装置(2) は、上記コンテナボックス(1) の一端開口部(開口面)を封ずるように据付けられている。また、(3) は、上記冷凍装置(2) のアルミニウム製のケーシングであって、このケーシング(3) の内面板である正面板(20) (後述する)を上記コンテナボックス(1)の庫内側(A) に臨ませ、この正面板(20)を除く各面板(21)~(24) (後述する)を庫外側(B) に臨ませてそれぞれ配設している。さらに、上記ケーシング(3) 内の上下方向略中央部には断面略コ字状の

仕切板(4) が設けられており、該仕切板(4) によって、上方の庫内側ユニット(5) と下方の庫外側ユニット(6) とにそれぞれ区画されている。

【0024】上記ケーシング(3) は、特に、庫内側ユニット(5) の庫外側(B) 面である底板(22)、背面板(24) (外面板) および庫外側ユニット(6) の庫外側(A) 面である正面板(20)の下部にグラスファイバもしくは発泡製合成樹脂等の断熱材(7) を介したハウジング(8) によって形成され、図12に示すように、該庫内側ユニット(5) 内には、冷媒回路のうち少なくとも蒸発器(9)、該蒸発器(9) に庫内空気を吹付けるための庫内側ファン(10)、(10)、…、および該各庫内側ファン(10)を駆動させるモータ(11)、(11)、…がそれぞれ収納されている。一方、上記庫外側ユニット(6) 内には、凝縮器(12)、該凝縮器(12)に庫外空気を吹付けるための庫外側ファン(13)、減圧機構としての膨脹弁(14)、および圧縮機(15)などが収納されている。そして、上記蒸発器(9)、凝縮器(12)、膨脹弁(図示省略)、および圧縮機(15)などは、冷媒配管によって冷媒の循環可能に接続されている。

【0025】また、上記ケーシング(3) は、庫内側(A) の正面板(20)、および庫外側(B) の天板(21)、底板(22) (仕切板(4) の上面)、両側面板(23)、(23)、背面板(24)からなる。上記正面板(20)の上部(庫内側ユニット(5) の上流端)には横方向(図4では左右方向)に延びる細長い庫内側空気戻口(25)が設けられているとともに、該正面板(20)の下部(庫内側ユニット(5) の下流端)には横方向に延びる細長い庫内側空気吹出口(26)が設けられている。そして、上記庫内側ユニット(5) のケーシング(3) 内には、上記庫内側空気戻口(25)に上流端が連結された空気導入通路(27)が設けられている。

【0026】上記ケーシング(3) (庫内側ユニット(5)) 内の天板(21)と底板(22)との間の略中央部、つまり、空気通路(3a)を形成する空気導入通路(27)には、蒸発器室(30)が設けられている。また、上記蒸発器室(30)には、上述した蒸発器(9) が設けられている。さらに、上記蒸発器(9) は、吸入面(9a)が庫内側空気吸入口(25)に対向するように上向き状態で設けられている。そして、上記庫内側空気吸入口(25)を介して蒸発器(9) を通過したコンテナボックス(1) 内の庫内空気は、その空気中に含まれた水分が蒸発器(9) との熱交換によりドレン水となって下方に滴下し、該蒸発器(9) の下方に位置する略逆V字状に形成された底板(22) (仕切板(4)) を兼ねたドレンパン(31)によってドレン水が貯溜される。尚、上記ドレンパン(31)には、一端がコンテナボックス(1) 外に開口するドレンパイプ(図示せず)の他端が連結されていて、ドレンパン(31)に貯溜したドレン水のコンテナボックス(1) 外(庫外) への排出がなされている。

【0027】そして、上記蒸発器室(30)の左右側方、つまり空気導入通路(27)の下流端には、上記庫内側ユニッ

ト(5) (冷凍装置(2)) の上下方向に延びて、上記正面板(20)の左右側端部と背面板(24)の左右側端部とより空気通路(3a)を形成する第1 空気通路(32)、(32) の上流端が連結されている。また、上記蒸発器室(30)と第1 空気通路(32) (右側のみ説明する) との間には、上記蒸発器(9) の左右側面に取付けられた略L字状の遮蔽板(33)が設けられている。さらに、上記遮蔽板(33)の下面と、上記ドレンパン(31) (底板(22)) との間には隙間(34)が設けられている。

【0028】上記蒸発器(9) の左右の上方(上流側)となる空気導入通路(27)の上流端には、上記モータ(11)、(11) が設けられていて、該各モータ(11)の軸(35)は、上下方向(ケーシング(3) の天板(21)および底板(22)に対して直交する方向)に延びている。また、上記各モータ(11)の軸(35)には、上記庫内側ファン(10)、(10) がそれぞれ取付けられている。上記各庫内側ファン(10)はプロペラファンであって、該庫内側ファン(10)によって、上記コンテナボックス(1) 内を循環したのち庫内側空気戻口(25)から蒸発器(9) を通過して該蒸発器(9) との熱交換により再び低温の空調風となった庫内空気が隙間(34)を介して第1 空気通路(32)に導かれた後、該第1 空気通路(32)を介して底板(22)付近に位置する庫内側吹出口(26)からコンテナボックス(1) 内に下吹出しされるようになっている。そして、上記各第1 空気通路(32)の下流端(下端)には、上記庫内側ユニット(5) (冷凍装置(2)) の幅方向に延びて、上記正面板(20)の下端部と背面板(24)の下端部とにより空気通路(3a)を形成する第2 空気通路(36)の上流端(左右端)が連結されていて、上記各第1 空気通路(32)と第2 空気通路(36)とは、上記空気導入通路(27)を介して庫内側空気戻口(25)と庫内側空気吹出口(26)とを連通している。尚、上記コンテナボックス(1) 内の底面部(1a)には、上記ケーシング(3) の正面板(20)に対して直交する方向に延びるT字状のフロアレール(37)、…が所定間隔置きに敷設されている。

【0029】また、図2にも示すように、上記ケーシング(3) 内の右側に位置する庫内側ユニット(5) には、一端がケーシング(3) の背面板(24)に開口し且つ他端が庫内側ファン(10)の直上流側の空気導入通路(27)に開口して庫外空気を空気導入通路(27)内の庫内空気との差圧により庫内側ファン(10)の上流側に導入する庫外空気導入路(41)が設けられているとともに、一端がケーシング(3) の背面板(24)に開口し且つ他端が庫内側ファン(10)の直下流側の蒸発器室(20)に開口して蒸発器室(20)内の庫内空気を庫外空気との差圧により庫外に排出する庫内空気導出路(42)が設けられている。そして、上記庫外空気導入路(41)および庫内空気導出路(42)が換気手段(3a)の一部を構成し、上記庫内側ファン(10)によって、上記庫内側空気戻口(25)から空気導入通路(27)を介して戻る庫内空気に、上記庫外空気導入路(41)を介して導入された庫外空気が混合された後、この混合させた庫内空気

(混合空気)のうち、一部が上記庫内空気導出路(42)より庫外に排出されて庫内空気の換気がなされる一方、残る庫内空気が上記蒸発器(9)で熱交換された後、上記第1および第2空気通路(32),(36)を介して庫内側空気吹出口(26)からコンテナボックス(1)内に送給せしめられるようになっている。

【0030】そして、上記庫外空気導入路(41)および庫内空気導出路(42)は、断熱材(7)を介してハウジング(8)を貫通するFRP製のパイプ材(43)が介在されて構成されてなり、この断面円形状の各パイプ材(43)の内外端部には、密輸などを未然に防止するTIR条約の規定により、直径約3mmの多数の孔部を穿設してなる第1パンチングプレート(44)が内端部側に、直径約10mmの多数の孔部を穿設してなる第2パンチングプレート(45)が外端部側にそれぞれ取付けられている。そして、上記庫外空気導入路(41)および庫内空気導出路(42)に対応するケーシング(1)の背面板(24)には、該庫外空気導入路(41)(パイプ材(43))の庫外側(B)に開口する庫外側導入口(41a)から導入される庫外空気導入量と、庫内空気導出路(42)(パイプ材(43))の庫外側(B)に開口する庫外側排出口(42a)から排出される庫内空気排出量との相互量の調整により庫内空気を換気する換気手段(46)が構成されている。上記庫外空気導入路(41)の庫外側導入口(41a)および庫内空気導出路(42)の庫外側排出口(42a)は、ケーシング(1)の背面板(24)の上端部略中間位置において上下に近接配置されている。また、図4ないし図7に示すように、上記換気手段(46)は、ケーシング(3)の背面板(24)の外面側に上下方向へスライド自在に支持された上下方向へ細長い略長方形形状のスライド蓋(47)を有している。上記スライド蓋(47)には、上側に位置する第2庫外空気導入路(41)の庫外側導入口(41a)を開口面積可変に開閉させる孔部(47a),(47a)が上下方向略中間位置に設けられており、このスライド蓋(47)の上下方向へのスライド移動によって、庫外側導入口(41a)のみならず上記庫内空気導出路(42)の庫外側排出口(42a)を開口面積可変に開閉させるようになっている。

【0031】また、図1に示すように、上記スライド蓋(47)の左右側方には、左右の庫内側ファン(10),(10)およびモータ(11),(11)を左右個別の点検を容易に行うためのサービス蓋(48),(48)が設けられており、この一方のサービス蓋(48)(図では左側)には、スライド蓋(47)のスライド移動量により庫内空気排出量と庫外空気導入量との相互量を調整して庫内空気の換気量を設定可能とする銘板(49)が取付けられていて、この銘板(49)によって庫内空気の換気量が全閉時の $0\text{ m}^3/\text{h}$ から全開時の $150\text{ m}^3/\text{h}$ の範囲で目盛りに従い適宜設定されるようになっている。また、上記スライド蓋(47)の左右側部にはフランジ片(50),(50)が設けられており、該各フランジ片(50),(50)の上下位置には、上下方向へ細長い長穴(50a),…が設けられている。そして、上記各長穴(50a)

に対応する背面板(24)には、掬子穴(図示せず)が設けられている。上記スライド蓋(47)は、各長穴(50a)を介して挿通された螺ボルト(51),…による掬子穴への螺合によってスライド移動不能に背面板(24)の外面側に対して固定されるようになっている。

【0032】そして、本発明の特徴部分として、図3にも示すように、上記庫外空気導入路(41)および庫内空気導出路(42)における第2パンチングプレート(45)の外面側には、庫外側導入口(41a)および庫外側排出口(42a)(図では一方のみ示す)の断面形状と略一致する板体としての換気孔蓋(52)がビス(53),(53)止めにより取付けられている。上記換気孔蓋(52)の略中央部には、スライド蓋(47)の開放側に向かって開口面積が漸増するよう略逆三角形形状に形成された開口(52a)が設けられている。そして、図8に示すように、上記換気手段(46)は、上記スライド蓋(47)の開放側(上方)へのスライド移動量が小さい小換気量時にはスライド移動量当たりの庫外側導入口(41a)および庫外側排出口(42a)の開口面積の増加率を共に小さくし、かつスライド蓋(47)の開放側へのスライド移動量が大きい大換気量時にはスライド移動量当たりの庫外側導入口(41a)および庫外側排出口(42a)の開口面積の増加率を共に大きくするように設定されていて、コンテナボックス(1)内の輸送物の温度条件に反しないよう換気を行うようになっている。

【0033】尚、上記庫外側ユニット(6)では、庫外側ファン(13)により吸込まれたコンテナボックス(1)外の空気によって高温となる凝縮器(12)との熱交換がなされている。

【0034】ここで、上記コンテナボックス(1)内の輸送物がキウイフルーツ等の青果物である場合について述べるが、まず、コンテナボックス(1)内を低温状態に保ちつつ換気手段(46)による換気が行われるよう、スライド蓋(47)を図4に示す全閉位置から図5の小換気量位置まで開放側へスライド移動させて、庫外空気導入路(41)の庫外側導入口(41a)から導入される庫外空気導入量と、庫内空気導出路(42)の庫外側排出口(42a)から排出される庫内空気排出量との相互量の調整により庫内空気を換気する。このスライド蓋(47)の開放側へのスライド移動量としては、キウイフルーツが庫内温度を摂氏0度で換気量を $20\text{ m}^3/\text{h}$ に設定する条件であることから、スライド蓋(47)を銘板(49)の目盛りに従って $20\text{ m}^3/\text{h}$ まで開放側へスライド移動させ、この状態で、スライド蓋(47)を左右のフランジ片(50),(50)の各長穴(50a)を介して挿通した螺ボルト(51),…による掬子穴への螺合によってスライド移動不能に背面板(24)の外面側に対して固定する。これにより、庫外空気導入路(41)の庫外側導入口(41a)にビス(53),(53)止めした換気孔蓋(52)の開口(52a)のスライド蓋(47)の反スライド開放側の一部(略逆三角形の下端部)がスライド蓋(47)の上側の孔部(47a)を介して庫外側(B)に開口し、この換気孔

蓋(52)の開口(52a)の一部を介して庫外空気が庫内空気との差圧により空気導入通路(27)内に導入される。そして、この庫外空気導入路(41)より導入された湿度の高い庫外空気が、庫内側ファン(10)によって庫内側空気戻口(25)から空気導入通路(27)を介して戻る庫内空気に混合された後、この混合された庫内空気(混合空気)のうち、一部が庫内空気導出路(42)より庫外側(B)に排出される一方、残る庫内空気が蒸発器(9)を介して摂氏0度まで冷却され、しかる後、第1および第2空気通路(32),(36)を介して庫内側空気吹出口(26)からコンテナボックス(1)内に送給せしめることにより、コンテナボックス(1)内の庫内空気が常時冷却されつつ加湿換気されることになる。

【0035】そして、庫内空気が庫内設定温度になるように冷媒回路の冷凍能力を制御して、該庫内空気(混合空気)により、コンテナボックス(1)内の温度が青果物(輸送物)に応じた摂氏0度の低温状態に常時保たれることになる。

【0036】このように、コンテナボックス(1)内の輸送物が、庫内温度を摂氏0度に保持しつつ換気量を $20\text{ m}^3/\text{h}$ に設定することを要求するキウイフルーツなどの青果物である場合には、換気手段(46)のスライド蓋(47)は、銘板(49)の目盛りに従って開放側へのスライド移動量を $20\text{ m}^3/\text{h}$ に固定して庫外側導入口(41a)および庫外側排出口(42a)を小さく開口させて小換気量に対応させるようにしている。

【0037】その場合、スライド蓋(47)により開口される庫外側導入口(41a)および庫外側排出口(42a)は、該庫外側導入口(41a)および庫外側排出口(42a)の第2パンチングプレート(45)に取付けた、スライド蓋(47)の開放側に行くに従い開口面積が漸増する換気孔蓋(52)の開口(52a)により、換気量が $20\text{ m}^3/\text{h}$ 程度となる小換気量時におけるスライド蓋(47)のスライド移動量当たりの庫外側導入口(41a)および庫外側排出口(42a)の開口面積の増加率が共に小さくなるように設定されているので、図8に実線で示すように、スライド蓋のスライド移動量に対する換気量特性が小換気量域内に位置せしめられて、小換気量時に開放側へ小さくスライド移動量させたスライド蓋(47)と、庫外側排出口(42a)において開口する庫内側(A)の貫通孔を斜めに過ぎて排出される庫外側排出口(42a)との間からの庫内空気排出量が少なく抑えられる一方、庫内側ファン(10)上流側の庫内空気と庫外空気との間の差圧も小さく抑えられてスライド蓋(47)と庫外側導入口(41a)との間からの庫外空気導入量も自ずと減少し、小換気量条件下において庫内空気と庫外空気との混合空気の温度がその温度を検知した温度センサ(54)の出力に応じて冷凍能力制御手段(59)により連続的に調整されて低温状態を保ちつつ、キウイなどの青果物のコンテナによる遠隔地への輸送が円滑になされることになる。

【0038】また、上記の如く庫外側導入口(41a)および庫外側排出口(42a)に取付けた第2パンチングプレート(45)のスライド蓋(47)の開放側に行くに従い開口面積が漸増する換気孔蓋(52)の開口(52a)により、大換気量時におけるスライド蓋(47)のスライド移動量当たりの庫外側導入口(41a)および庫外側排出口(42a)の開口面積の増加率が共に大きくなるように設定されているので、コンテナボックス(1)内の輸送物が庫内温度を摂氏18度程度に保持しつつ換気量を大きく設定することを要求する球根などである場合、スライド蓋(47)は、開放側へのスライド移動量を大きくする大換気量位置にて庫外側導入口(41a)および庫外側排出口(42a)を大きく開口させて大換気量に対応させることにより、図8に実線で示すように、スライド蓋(47)のスライド移動量に対する換気量特性が大換気量域内に位置せしめられて、開放側へ大きくスライド移動量させたスライド蓋(47)により開口する庫外側排出口(42a)からの庫内空気排出量が多くなる一方、スライド蓋(47)と庫外側導入口(41a)との間からの庫外空気導入量も自ずと増加し、大換気量条件下において庫内空気と庫外空気との混合空気の温度を検知した温度センサ(54)の出力に応じて冷凍能力制御手段(59)により連続的に調整されて低温状態を保ちつつ、球根などのコンテナによる遠隔地への輸送が円滑になされることになる。

【0039】これにより、コンテナボックス(1)内の輸送物に応じて換気手段(46)のスライド蓋(47)をスライド移動させることによって、小換気量時におけるスライド蓋(47)のスライド移動量当たりの庫外側導入口(41a)および庫外側排出口(42a)の開口面積の増加率を共に小さくする一方、大換気量時におけるスライド蓋(47)のスライド移動量当たりの庫外側導入口(41a)および庫外側排出口(42a)の開口面積の増加率を共に大きくするように設定され、スライド蓋のスライド移動量に対する換気量特性が図8において実線で示すようにリニアに近付くことになり、スライド蓋(47)のスライド移動による庫外側導入口(41a)および庫外側排出口(42a)の開度調整を円滑に行うことができる。しかも、小換気量時であるにも拘らず換気量増大による冷凍装置(2)への着霜が防止され、冷凍装置(2)の冷凍能力の低下を防止することができる。

【0040】また、換気手段(46)によるスライド蓋(47)の開放側へのスライド移動量当たりの開口面積の増加率の設定が、庫外側導入口(41a)および庫外側排出口(42a)にそれぞれ取付けた換気孔蓋(52)の開口(52a)の形状によって行われることにより、換気孔蓋(52)を追加するだけで、既存の庫外側導入口および庫外側排出口並びにスライド蓋を流用して換気手段(46)を構成することができ、安価な換気手段(46)を提供することができる。

【0041】さらに、上記の如く換気孔蓋(52)の追加により換気手段(46)が構成されていることから、既存のコ

ンテナ用冷凍装置にも容易に適用することができ、既存のコンテナ用冷凍装置に対する換気手段(46)の汎用性を図ることができる。

【0042】しかも、上記換気孔蓋(52)の開口(52a)の形状が、スライド蓋(47)を開放側に行くに従い開口面積が漸増するよう略逆三角形形状に形成されていることにより、換気孔蓋(52)の開口(52a)が簡単かつ容易に形成され、換気手段(46)を簡単かつ容易に構成することができる。

【0043】尚、本発明は上記実施例に限定されるものではなく、その他種々の変形例を包含するものである。例えば、上記実施例では、庫外側導入口(41a)および庫外側排出口(42a)の第2パンチングプレート(45)に取付けた換気孔蓋(52)の開口(52a)により、スライド蓋(47)の開放側へのスライド移動によって庫外側導入口(41a)からの庫外空気導入力および庫外側排出口(42a)からの庫内空気排出量を相互に調整する換気手段(46)を構成したが、換気手段が、パイプ材自体の断面形状を略逆三角形形状に形成して構成されるようにしても良い。

【0044】また、上記実施例では、換気孔蓋(52)の開口(52a)の形状を略逆三角形形状に形成したが、図12に示すように、換気孔蓋(61)の開口(61a)の形状が、スライド蓋(47)の反開放側略半分部の形状が略逆三角形形状に、スライド蓋(47)の開放側略半分部の形状が略半円弧形状にそれぞれ形成されるようにしたり、図13に示すように、換気孔蓋(62)の開口(62a)の形状が、スライド蓋(47)の開放側略半分部の形状が略半円弧形状に形成されるよう、銀杏の葉形に形成されるようにしたり、換気孔蓋の開口の形状が、スライド蓋(47)の開放側略半分部の形状が略半円弧形状に形成されるよう、扇形に形成しても良く、要は、換気孔蓋の開口の形状が、少なくともスライド蓋の反開放側略半分部の形状が略逆三角形形状に形成されていれば良い。また、パイプ材自体の断面形状が、上記の如く略逆三角形形状と略半円弧形状とを組み合わせた形状に形成されていたり、銀杏の葉形や扇形に形成されていたりしても良いのは勿論である。

【図面の簡単な説明】

【図1】スライド蓋付近を庫外側より見た冷凍装置の背*

*面図である。

【図2】スライド蓋を庫外側導入口および庫外側排出口付近で切断した状態の背面板の縦断側面図である。

【図3】換気孔蓋の正面図である。

【図4】スライド蓋による全閉状態を示す図1相当図である。

【図5】スライド蓋による小換気量状態を示す図1相当図である。

【図6】スライド蓋による大換気量状態を示す図1相当図である。

【図7】スライド蓋による全開状態を示す図1相当図である。

【図8】スライド蓋のスライド移動量に対する換気量特性を示す特性図である。

【図9】庫外側より見た冷凍装置の背面図である。

【図10】図11のA-A線における断面図である。

【図11】正面板を取外した状態のコンテナボックスの縦断正面図である。

【図12】変形例に係る図3相当図である。

【図13】変形例に係る図3相当図である。

【符号の説明】

- (1) コンテナボックス
- (2) 冷凍装置
- (3) ケーシング
- (3a) 空気通路
- (10) 庫内側ファン
- (20) 正面板(内面板)
- (24) 背面板(外面板)
- (25) 庫内側空気戻口
- (26) 庫内側空気吹出口
- (41) 庫外空気導入口
- (41a) 庫外側導入口
- (42) 庫内空気導出口
- (42a) 庫外側排出口
- (46) 換気手段
- (47) スライド蓋
- (52), (61), (62) 換気孔蓋(板体)
- (52a), (61a), (62a) 開口

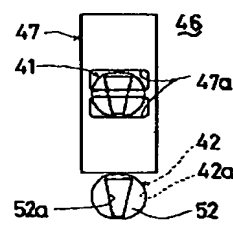
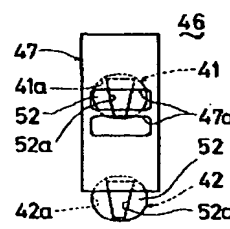
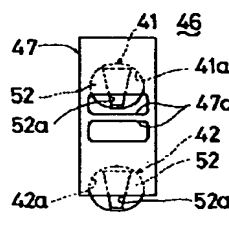
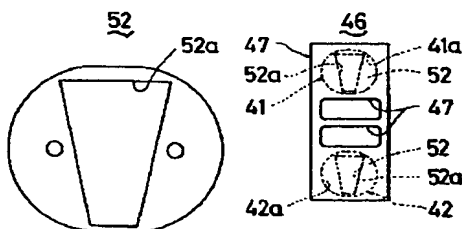
【図3】

【図4】

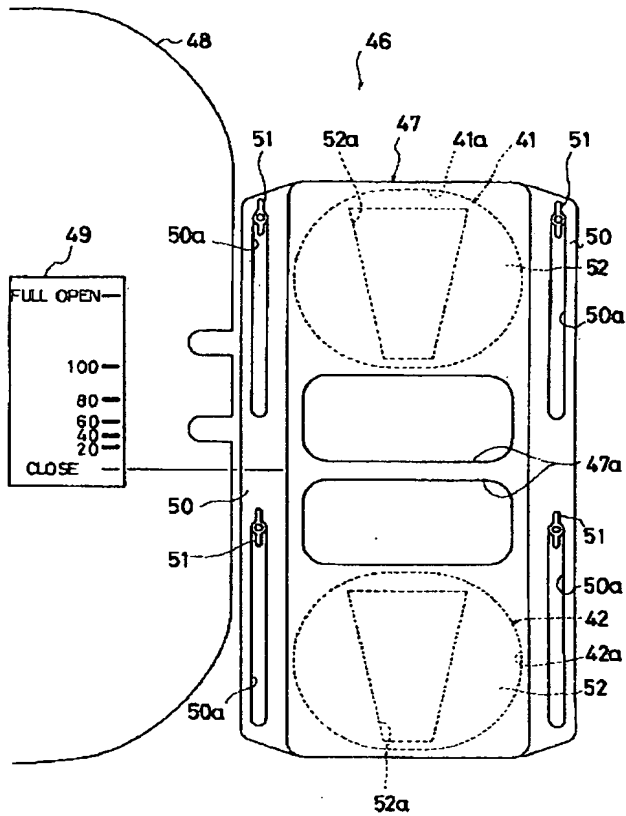
【図5】

【図6】

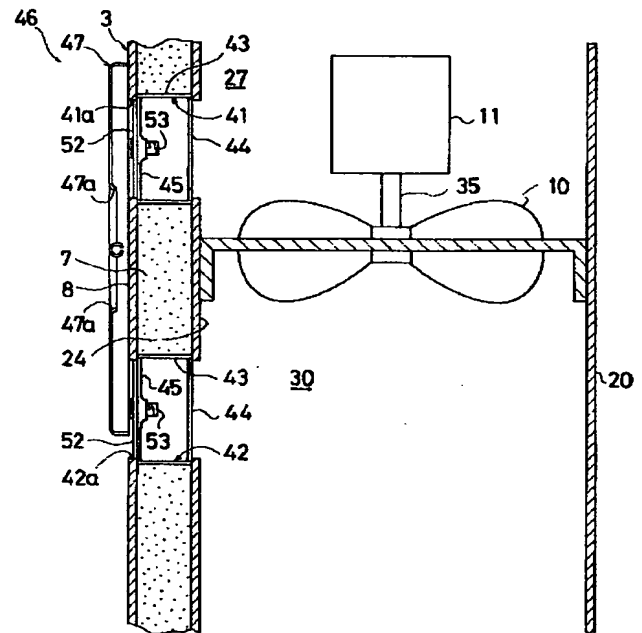
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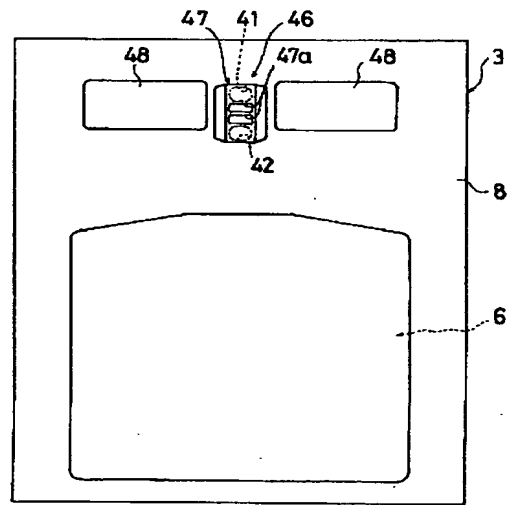
【図 1】



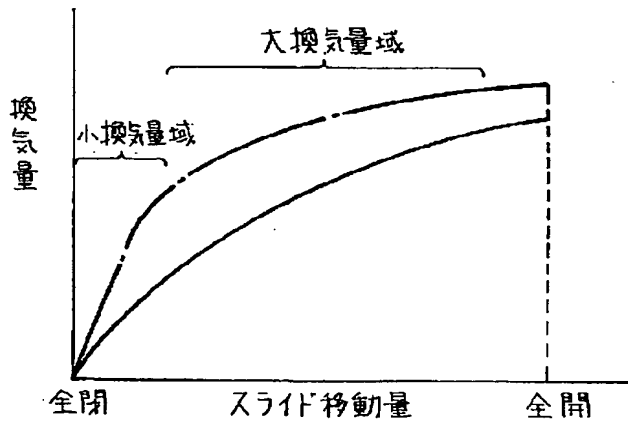
【図2】



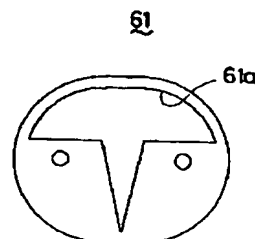
【図9】



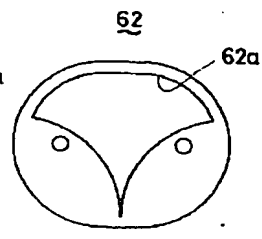
【圖8】



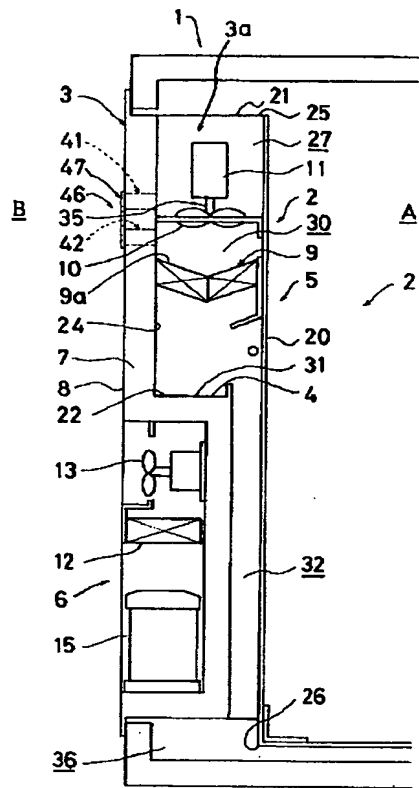
【圖 12】



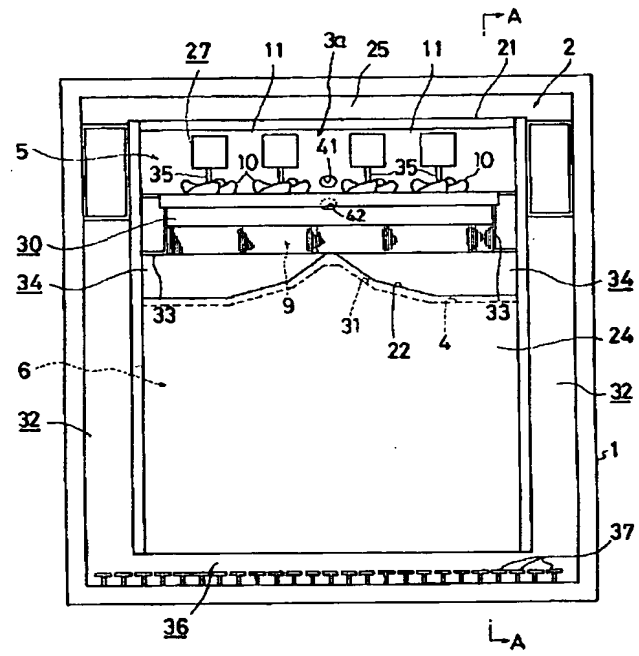
【圖 13】



【図10】



【図11】



PATENT ABSTRACTS OF JAPAN

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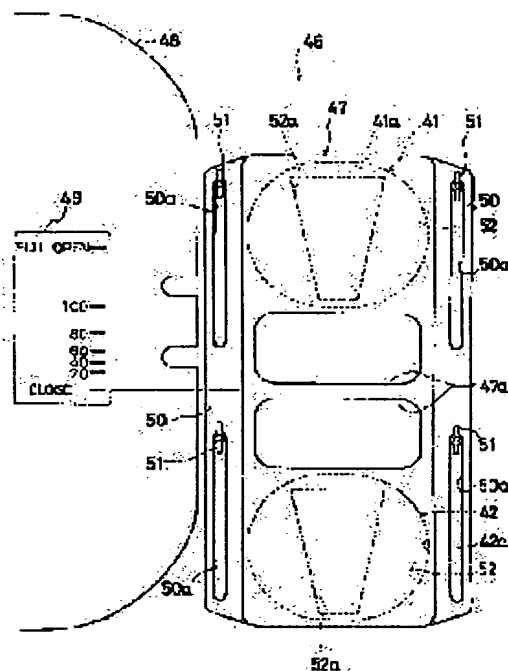
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(54) REFRIGERATING APPARATUS FOR CONTAINERS

(57)Abstract:

PURPOSE: To smoothly control an opening degree of a slide cover and prevent reduction of refrigerating capacity on the occasion of a small amount of ventilation by making a characteristics of ventilation relative to an amount of sliding movement of the slide cover nearly linear.

CONSTITUTION: In an indoor unit is provided a ventilating device 46 capable of controlling a volume of outdoor air introduced from an outdoor side inlet 41a through a second outdoor air inlet 41 opened to an outdoor side at one end thereof and to a side upstream of a room fan at the other end thereof and a volume of discharged indoor air introduced from an outdoor side outlet 42a through an indoor air outlet 42 opened to an outdoor side at one end thereof and to a side downstream of the room fan at the other end thereof relative to each other. The ventilating device 46 has a slide cover 47, and sets rates of increase in opening areas of the outdoor side inlet 41a and outdoor side outlet 42a per amount of sliding movement of the slide cover 47 to make both of them small on the occasion of a small volume of ventilation, in which an amount of sliding movement of the slide cover 47 toward the opening side is small, and to make both of them large on the occasion of a large volume of ventilation, in which an amount of sliding movement of the slide cover 47 toward the opening side is large.



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CLAIMS

[Claim(s)]

[Claim 1] Container box (1) An outside plate (24) and an inside plate (20) are put side by side in the front section. Between this outside plate (24) and an inside plate (20) While the air duct (3a) which circulates the air in a warehouse by the fan (10) is formed, to the above-mentioned outside plate (24) An end is a warehouse outside (B). The air installation way outside a warehouse as for which the other end carries out opening to a fan's (10)'s upstream in the above-mentioned air duct (3a) (41), An end is a warehouse outside (B). The air derivation way in a warehouse as for which the other end carries out opening to a fan's (10)'s downstream in the above-mentioned air duct (3a) (42), warehouse outside inlet (41a) of the above-mentioned air installation way outside a warehouse (41) from -- warehouse outside exhaust port (42a) of the amount of air installation, and the above-mentioned air derivation way in a warehouse (42) from -- so that an air volume displacement may be adjusted This warehouse outside inlet (41a) Warehouse outside exhaust port (42a) A ventilation means (46) to have the slide lid (47) opened and closed to the opening area adjustable, and to ventilate the air in a warehouse is established. This ventilation means (46) is a warehouse outside inlet per slide movement magnitude (41a) at the time of a small gas exchange with the small amount of disconnection of the above-mentioned slide lid (47). And warehouse outside exhaust port (42a) While both becoming small, the rate of increase of opening area At the time of a large gas exchange with the large amount of disconnection of a slide lid (47), it is a warehouse outside inlet per slide movement magnitude (41a). And warehouse outside exhaust port (42a) Freezer for containers characterized by being constituted so that it may both become large about the rate of increase of opening area.

[Claim 2] Warehouse outside inlet of a ventilation means (46) (41a) And warehouse outside exhaust port (42a) The warehouse outside inlet (41a) and warehouse outside exhaust port (42a) per slide movement magnitude by the side of disconnection of a slide lid (47) Freezer for containers according to claim 1 characterized by being formed in the opening configuration from which the rate of increase of opening area changes.

[Claim 3] A ventilation means (46) is a warehouse outside inlet (41a). And warehouse outside exhaust port (42a) Opening attached, respectively (52a) With the opening configuration of the board (52) which it has Warehouse outside inlet per slide movement magnitude by the side of disconnection of a slide lid (47) (41a) And warehouse outside exhaust port (42a) Freezer for containers according to claim 1 characterized by setting up the rate of increase of opening area.

[Claim 4] An opening configuration is a freezer for containers according to claim 2 or 3 characterized by forming the configuration of the anti-disconnection side abbreviation one half section of a slide lid (47) in the shape of an abbreviation inverse triangle at least.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the freezer with which the reefer container for fresh object storage was equipped especially about the freezer for containers installed in container each, such as for example, a container for ocean transportations.

[0002]

[Description of the Prior Art] Generally it sets to this freezer for seed containers. Make the front board of casing face inside [warehouse] a container box, and make a warehouse outside face each face-plate except this front board, and it is arranged, respectively. This casing is divided to a upside warehouse inside unit and a lower warehouse outside unit with the dashboard formed in the vertical direction abbreviation pars intermedia. While containing the warehouse inside fans (for example, propeller fan etc.) for [of the components of the refrigerant circuit of a freezer (for example, hot gas bypass method)] spraying an evaporator and this evaporator in the air in a warehouse at least to the above-mentioned warehouse inside unit It comes to contain a compressor in the warehouse outside fan list for spraying a condenser and this condenser in the air outside a warehouse at least at the above-mentioned warehouse outside unit. By the above-mentioned warehouse inside fan He is trying to make it feed in a container box from the warehouse inside air port in which the air in a warehouse which carried out heat exchange with the above-mentioned evaporator from the warehouse inside air port established in the above-mentioned casing was prepared by casing. And in order to hold the freshness of a fresh object in this case, it is required to save by the optimum conditions according to the class of that fresh object. For example, when a fresh object is garden stuff and to be the temperature requirement (for example, temperature requirement near 0 times Centigrade - 20 degrees) where low temperature injury is not encountered is demanded, since ethylene gas is discharged by metabolism if garden stuff etc. has, it is required that the inside of a warehouse should be ventilated.

[0003] And the container for fresh object transportation by which the fall of freshness enables transportation of remarkable early garden stuff etc. to remote places, such as overseas, attracts attention under such a demand. As a conventional thing of the freezer for containers For example, the air installation way outside a warehouse which an end carries out opening to a warehouse outside, and the other end carries out opening to a warehouse inside fan's upstream, and introduces the air outside a warehouse into a warehouse inside unit at a warehouse inside fan's upstream so that it may be indicated by JP,3-36478,A, While preparing the air derivation way in a warehouse which an end carries out opening to a warehouse outside, and the other end carries out opening to a warehouse inside fan's downstream, and discharges the air in a warehouse outside a warehouse The amount of air installation outside a warehouse introduced into the tooth-back plate of the above-mentioned casing from the warehouse outside inlet which carries out opening to the warehouse outside of the above-mentioned air installation way outside a warehouse, A ventilation means to ventilate the air in a warehouse by adjustment of a mutual amount with the air volume displacement

in a warehouse discharged from the warehouse outside exhaust port which carries out opening is formed in the warehouse outside of the above-mentioned air derivation way in a warehouse. This ventilation means It has the slide lid which makes the opening area adjustable open and close the warehouse outside inlet and warehouse outside exhaust port which were supported free [a slide to the tooth-back plate of casing]. By the differential pressure which is made to carry out opening of a warehouse outside inlet and the warehouse outside exhaust port by slide migration by the side of disconnection of this slide lid, and is produced between the air outside a warehouse, and the air in a warehouse After making it mix from warehouse inside air **** in which the air outside a warehouse with the high humidity made to flow from the air installation way outside a warehouse was prepared by casing to the air in a warehouse, While discharging a part outside a warehouse from the above-mentioned air derivation way in a warehouse among the air in this mixed warehouse (mixed air) and ventilating the air in a warehouse, he is trying to make it feed in a container box from the warehouse inside air port in which the air in a warehouse which remains was prepared by casing.

[0004] In this case, a warehouse outside inlet and a warehouse outside exhaust port are formed in a circle configuration, and he is trying to adjust the mutual amount (gas exchange) of the amount of air installation outside a warehouse introduced from a warehouse outside inlet, and the air volume displacement in a warehouse discharged from a warehouse outside exhaust port by making the opening area adjustable open and close this warehouse outside inlet and a warehouse outside exhaust port with a slide lid. That is, while making small slide movement magnitude by the side of disconnection of a slide lid at the time of a small gas exchange, it is made to ventilate by enlarging slide movement magnitude at the time of a large gas exchange, performing a temperature setup according to a fresh object (especially garden stuff) etc.

[0005]

[Problem(s) to be Solved by the Invention] Thus, in addition to a setup of the temperature conditions according to the class of the garden stuff, it is necessary to ventilate for transportation to the remote place by the container of garden stuff also among fresh objects. Therefore, he is trying to correspond in the small gas exchange location which makes small slide movement magnitude by the side of disconnection of a slide lid so that the conditions which set a gas exchange as $20\text{m}^3 / \text{h}$ grade, holding whenever [transportation conditions / of this kiwi fruit / i.e., warehouse internal temperature,] to 0 times about Centigrade may be filled with the above-mentioned conventional freezer for containers, when transportation objects are garden stuff, such as a kiwi fruit, for example.

[0006] However, in the above-mentioned conventional freezer for containers, as shown in the property Fig. of the gas exchange to the slide movement magnitude of the slide lid shown by the imaginary line (alternate long and short dash line) in drawing 8, although the slide movement magnitude by the side of disconnection of a slide lid is small, it has the fault that a gas exchange increases remarkably.

[0007] Since the warehouse outside inlet of the air installation way outside a warehouse and the warehouse outside exhaust port of the air derivation way in a warehouse penetrate the tooth-back plate of heavy-gage casing which made the heat insulator etc. placed between the interior in a circle configuration and are prepared as this factor Even if it makes small slide movement magnitude by the side of disconnection of a slide lid, although the above-mentioned warehouse outside inlet and a warehouse outside exhaust port are circle configurations therefore, both the rate of increase of the opening area per slide movement magnitude of a slide lid becomes large. Since it is aslant discharged as ****, while the discharge (air volume displacement in a warehouse) from a warehouse outside exhaust port increases remarkably, the through tube of the warehouse inside in which the air in a warehouse from this warehouse outside exhaust port carries out opening in a warehouse outside exhaust port It is because the amount of air installation outside a warehouse from a warehouse outside inlet also increases naturally and a gas exchange is increased by the differential pressure between the air in a warehouse of the warehouse inside fan upstream and the air outside a warehouse which become large in connection with this.

[0008] For this reason, opening adjustment (opening area adjustment) of the warehouse outside inlet by the slide migration by the side of disconnection of the slide lid at the time of the small gas exchange corresponding to the transportation conditions of garden stuff, such as a kiwi fruit, and a warehouse outside exhaust port will become very difficult.

[0009] And if a gas exchange increases remarkably in spite of wanting to hold whenever [warehouse internal temperature] to 0 times Centigrade, it also has the fault that refrigerating capacity declines by the frost to a freezer.

[0010] This invention was made in view of this point, and the place made into the purpose uses the fall of the refrigerating capacity by the frost to the freezer at the time of a small gas exchange as a prevention plug while a ventilation means is improved so that the property of a gas exchange over the slide movement magnitude of a slide lid may approach a linear, and enabling it to perform smoothly opening adjustment of the warehouse outside inlet by slide migration of a slide lid, and a warehouse outside exhaust port.

[0011]

[Means for Solving the Problem] The solution means which invention according to claim 1 provided in order to attain the above-mentioned purpose is a container box (1). An outside plate (24) and an inside plate (20) are put side by side in the front section, and the air duct (3a) which circulates the air in a warehouse by the fan (10) is formed between this outside plate (24) and the inside plate (20). And in the above-mentioned outside plate (24), an end is a warehouse outside (B). The air installation way outside a warehouse as for which the other end carries out opening to a fan's (10)'s upstream in the above-mentioned air duct (3a) (41), An end is a warehouse outside (B). The air derivation way in a warehouse as for which the other end carries out opening to a fan's (10)'s downstream in the above-mentioned air duct (3a) (42), warehouse outside exhaust port (42a) of the amount of air installation from the warehouse outside inlet (41a) of the above-mentioned air installation way outside a warehouse (41), and the above-mentioned air derivation way in a warehouse (42) from -- so that an air volume displacement may be adjusted This warehouse outside inlet (41a) Warehouse outside exhaust port (42a) A ventilation means (46) to have the slide lid (47) opened and closed to the opening area adjustable, and to ventilate the air in a warehouse is established. In addition, this ventilation means (46) is a warehouse outside inlet per slide movement magnitude (41a) at the time of a small gas exchange with the small amount of disconnection of the above-mentioned slide lid (47). And warehouse outside exhaust port (42a) While both becoming small, the rate of increase of opening area At the time of a large gas exchange with the large amount of disconnection of the above-mentioned slide lid (47), it is a warehouse outside inlet per slide movement magnitude (41a). And warehouse outside exhaust port (42a) It is constituted so that it may both become large about the rate of increase of opening area.

[0012] Moreover, the means which invention according to claim 2 provided limits the ventilation means (46) of invention of the claim 1 above-mentioned publication, and is a warehouse outside inlet (41a). And warehouse outside exhaust port (42a) It is considering as the configuration formed in the opening configuration from which the rate of increase of the opening area per slide movement magnitude by the side of disconnection of a slide lid (47) changes.

[0013] Moreover, the means which invention according to claim 3 provided limits the ventilation means (46) of invention of the claim 1 above-mentioned publication, and is a warehouse outside inlet (41a). And warehouse outside exhaust port (42a) Opening attached, respectively (52a) The opening configuration of the board (52) which it has constitutes so that the rate of increase of the opening area per slide movement magnitude by the side of disconnection of a slide lid (47) may be set up.

[0014] Furthermore, the means which invention according to claim 4 provided specifies above-mentioned claim 2 or the opening configuration of invention given in three, and is considering it as the configuration which forms the configuration of the anti-disconnection side abbreviation one half section of a slide lid (47) in the shape of an abbreviation inverse triangle at least.

[0015]

[Function] By the above-mentioned configuration, in invention claim 1 or given in four When the transportation objects in a container box (1) are garden stuff, such as a kiwi fruit which requires that a gas exchange should be set as 20m³ / h, holding whenever [warehouse internal temperature] to 0 times about Centigrade, The slide lid (47) of a ventilation means (46) is a warehouse outside inlet (41a) in the small gas exchange location which makes small slide movement magnitude by the side of disconnection. And warehouse outside exhaust port (42a) He carries out opening small and is trying to make it correspond to a small gas exchange.

[0016] In that case, warehouse outside inlet by which opening is carried out with a slide lid (47) (41a) And warehouse outside exhaust port (42a) An opening configuration For example, the configuration of the anti-disconnection side abbreviation one half section of a slide lid (47) is formed in the shape of an abbreviation inverse triangle at least. Warehouse outside inlet per slide movement magnitude of the slide lid at the time of a small gas exchange (47) (41a) And warehouse outside exhaust port (42a) Since it is set up so that both the rate of increase of opening area may become small The slide lid which carried out slide movement magnitude small to the disconnection side at the time of a small gas exchange (47), Warehouse outside exhaust port (42a) The warehouse inside which sets and carries out opening (A) Warehouse outside exhaust port aslant discharged as **** in a through tube (42a) While the air volume displacement in a warehouse from between is stopped few The differential pressure between the air in a warehouse of the fan (10) upstream and the air outside a warehouse is also stopped small, and the amount of air installation outside a warehouse from between a slide lid (47) and warehouse outside inlets (41a) also decreases naturally. In the bottom of a small gas exchange condition, transportation to the remote place by the container of garden stuff, such as a kiwi fruit, will be made smoothly.

[0017] Moreover, it is a warehouse outside inlet (41a) like the above. And warehouse outside exhaust port (42a) An opening configuration The configuration of the anti-disconnection side abbreviation one half section of a slide lid (47) is formed in the shape of an abbreviation inverse triangle at least. Warehouse outside inlet per slide movement magnitude of the slide lid at the time of a large gas exchange (47) (41a) And warehouse outside exhaust port (42a) Since it is set up so that both the rate of increase of opening area may become large Container box (1) When it is the bulb which requires that a gas exchange should be set up greatly, an inner transportation object holding whenever [warehouse internal temperature] to 18-degree about Centigrade, a slide lid (47) It is a warehouse outside inlet (41a) in the large gas exchange location which enlarges slide movement magnitude by the side of disconnection. And warehouse outside exhaust port (42a) He carries out opening greatly and is trying to make it correspond to a large gas exchange. that is, warehouse outside exhaust port (42a) which carries out opening with the slide lid (47) which carried out slide movement magnitude greatly to the disconnection side from -- while the air volume displacement in a warehouse increases -- a slide lid (47) and warehouse outside inlet (41a) The amount of air installation outside a warehouse from between will also increase naturally, and transportation to the remote place by containers, such as a bulb, will be smoothly made in the bottom of a large gas exchange condition.

[0018]

[Effect of the Invention] According to the freezer for containers in invention according to claim 1, like the above Container box (1) By carrying out slide migration of the slide lid (47) of a ventilation means (46) according to an inner transportation object Warehouse outside inlet per slide movement magnitude of the slide lid at the time of a small gas exchange (47) (41a) And warehouse outside exhaust port (42a) While both making the rate of increase of opening area small Warehouse outside inlet per slide movement magnitude of the slide lid at the time of a large gas exchange (47) (41a) And warehouse outside exhaust port (42a) It sets up so that the rate of increase of opening area may both be enlarged. Warehouse outside inlet by slide migration of a slide lid (47) since the property of a gas exchange over the slide movement magnitude of a slide lid (47) was made to approach a linear (41a) And warehouse outside exhaust port (42a) Opening adjustment can be performed smoothly. And freezer at the time of the small gas exchange by gas exchange increase

(2) Frost is prevented and it is a freezer (2). The fall of refrigerating capacity can be prevented.

[0019] Moreover, according to the freezer for containers in invention according to claim 2 It is a warehouse outside inlet (41a) about a setup of the rate of increase of the opening area per slide movement magnitude by the side of disconnection of the slide lid (47) by the ventilation means (46). And warehouse outside exhaust port (42a) By carrying out with an opening configuration Warehouse outside inlet (41a) And warehouse outside exhaust port (42a) The existing slide lid can be diverted, a ventilation means (46) can be constituted only from changing an opening configuration, and a cheap ventilation means (46) can be offered.

[0020] Moreover, a setup of the rate of increase of the opening area per slide movement magnitude by the side of disconnection of the slide lid [according to the freezer for containers in invention according to claim 3] (47) by the ventilation means (46) Warehouse outside inlet (41a) And warehouse outside exhaust port (42a) By carrying out with the opening configuration of the board (52) attached, respectively, it is a pore (52a). Only by adding the board (52) which it has A slide lid can be diverted to the existing warehouse outside inlet and a warehouse outside exhaust port list, a ventilation means (46) can be constituted, and a cheaper ventilation means (46) can be offered. And it can apply also to the existing freezer for containers easily from constituting the ventilation means (46) by addition of the above-mentioned board (52), and versatility of the ventilation means (46) against the existing freezer for containers can be planned.

[0021] Furthermore, according to the freezer for containers in invention according to claim 4 Warehouse outside inlet (41a) And warehouse outside exhaust port (42a) An opening configuration or warehouse outside inlet (41a) And warehouse outside exhaust port (42a) Opening of the board (52) to attach (52a) A configuration By forming so that the configuration of the anti-disconnection side abbreviation one half section of a slide lid (47) may become abbreviation inverse triangle-like at least, a ventilation means (46) can be constituted simply and easily.

[0022]

[Example] Hereafter, the example of this invention is explained based on a drawing.

[0023] Drawing 9 thru/or drawing 11 show one example of the freezer for containers concerning this invention, and (1) is a container box and (2). It is a freezer and is this freezer (2). The above-mentioned container box (1) It is installed so that end opening (effective area) may be stopped. Moreover, (3) The above-mentioned freezer (2) It is casing made from aluminum and is this casing (3). The warehouse inside of the above-mentioned container box (1) (is mentioned later) (A) Warehouse outside is made to overlook and (is mentioned later) (B) It is made to face and is arranging, respectively. [the front board (20) which is an inside plate, and] [each face-plate (21) - (24) except this front board (20), and Furthermore, the above-mentioned casing (3) In the inner vertical direction abbreviation center section, it is a cross-section abbreviation KO character-like dashboard (4). It is prepared and is this dashboard (4). Upper warehouse inside unit (5) Downward warehouse outside unit (6) It is divided, respectively.

[0024] The above-mentioned casing (3) It is a warehouse inside unit (5) especially. Warehouse outside (B) The bottom plate which is a field (22), A tooth-back plate (24) (outside plate) and warehouse outside unit (6) Warehouse outside (A) They are heat insulators (7), such as a glass fiber or synthetic resin made from foaming, to the lower part of the front board (20) which is a field. Minded housing (8) It is formed. As shown in drawing 12, it is this warehouse inside unit (5). Inside It is an evaporator (9) at least among refrigerant circuits. This evaporator (9) The warehouse inside fan (10) for spraying the air in a warehouse, (10), -- and the motor (11) that makes this each warehouse inside fan (10) drive, (11), and -- are contained, respectively. On the other hand, it is the above-mentioned warehouse outside unit (6). Inside, the warehouse outside fan (13) for spraying a condenser (12) and this condenser (12) in the air outside a warehouse, the expansion valve (14) as reduced pressure control, the compressor (15), etc. are contained. And the above-mentioned evaporator (9) The condenser (12), the expansion valve (illustration abbreviation), the compressor (15), etc. are connected by refrigerant piping possible [circulation of a refrigerant].

[0025] Moreover, the above-mentioned casing (3) Warehouse inside (A) A front board (20) and

warehouse outside (B) A top plate (21), a bottom plate (22), (the top face of dashboard (4)), a both-sides face-plate (23), and (23) consists of a tooth-back plate (24). While long and slender warehouse inside air **** (25) prolonged in a longitudinal direction (drawing 4 longitudinal direction) is prepared in the upper part (upper edge of a warehouse inside unit (5)) of the above-mentioned front board (20), the long and slender warehouse inside air port (26) which extends in a longitudinal direction is established in the lower part (down-stream edge of a warehouse inside unit (5)) of this front board (20). And the above-mentioned warehouse inside unit (5) Casing (3) Inside, the air installation path (27) where the upper edge was connected with the above-mentioned warehouse inside air **** (25) is prepared.

[0026] The above-mentioned casing (3) The evaporator room (30) is established in the abbreviation center section between an inner (warehouse inside unit (5)) top plate (21) and a bottom plate (22), i.e., the air installation path which forms an air duct (3a), (27). Moreover, evaporator mentioned above in the above-mentioned evaporator room (30) (9) It is prepared. Furthermore, the above-mentioned evaporator (9) It is prepared in the state of facing up so that an inhalation side (9a) may counter warehouse inside air-suction-system opening (25). And the above-mentioned warehouse inside air-suction-system opening (25) is minded, and it is an evaporator (9). Container box through which it passed (1) The inner air in a warehouse The moisture contained in the air is an evaporator (9). It becomes drain water by heat exchange, is dropped caudad, and is this evaporator (9). Drain water is stored with the drain pan (31) which served both as the bottom plate (22) formed in the shape of [which is located below] abbreviation reverse V character, and (dashboard (4)). In addition, in the above-mentioned drain pan (31), an end is a container box (1). Container box of the drain water which the other end of the drainpipe (not shown) which carries out opening is connected outside, and was stored in the drain pan (31) (1) The discharge to outside (outside of a warehouse) is made.

[0027] and to the right-and-left side of the above-mentioned evaporator room (30), i.e., the down-stream edge of an air installation path (27) The above-mentioned warehouse inside unit (5) (freezer (2)) The 1st air duct (32) and (32) which are prolonged in the vertical direction and form an air duct (3a) from the right-and-left side edge section of the above-mentioned front board (20), and the right-and-left side edge section of a tooth-back plate (24) The upper edge is connected. Moreover, in between [the above-mentioned evaporator room (30), the 1st air duct (32), and (only right-hand side is explained)], it is the above-mentioned evaporator (9). The shield (33) of the letter of the abbreviation for L characters attached in left and right laterals is formed. Furthermore, the clearance (34) is prepared between the above-mentioned drain pan (31) and (bottom plate (22)). [the inferior surface of tongue of the above-mentioned shield (33), and]

[0028] The above-mentioned evaporator (9) In the upper edge of the air installation path (27) used as the upper part (upstream) on either side, it is the above-mentioned motor (11) and (11). It is prepared and the shaft (35) of each of this motor (11) is prolonged in the vertical direction (direction which intersects perpendicularly to the top plate (21) and bottom plate (22) of casing (3)). Moreover, in the shaft (35) of each above-mentioned motor (11), it is the above-mentioned warehouse inside fan (10) and (10). It is attached, respectively. Each above-mentioned warehouse inside fan (10) is a propeller fan. By this warehouse inside fan (10) The above-mentioned container box (1) Warehouse inside air **** (25) to evaporator after circulating through inside (9) It passes and is this evaporator (9). After the air in a warehouse which became the style [low temperature] of air-conditioning again by heat exchange was led to the 1st air duct (32) through the clearance (34), The warehouse inside outlet (26) located near a bottom plate (22) through this 1st air duct (32) to container box (1) It blows off the bottom inside. and in the down-stream edge (lower limit) of each 1st air duct (32) of the above The above-mentioned warehouse inside unit (5) (freezer (2)) Extend crosswise and the upper edge (right-and-left edge) of the 2nd air duct (36) which forms an air duct (3a) by the lower limit section of the above-mentioned front board (20) and the lower limit section of a tooth-back plate (24) is connected. Each 1st air duct (32) of the above and the 2nd air duct (36) are opening warehouse inside air **** (25) and a warehouse inside air port (26) for free passage through the

above-mentioned air installation path (27). In addition, the above-mentioned container box (1) In an inner bottom surface part (1a), is the above-mentioned casing (3). Floor rail of the shape of T character prolonged in the direction which intersects perpendicularly to a front board (20) (37), -- is laid every predetermined spacing.

[0029] moreover, it is shown also in drawing 2 -- as -- the above-mentioned casing (3) Warehouse inside unit (5) located in inner right-hand side **** -- An end is casing (3). Opening is carried out to a tooth-back plate (24), and the other end carries out opening to the air installation path (27) by the side of a warehouse inside fan's (10)'s right above style. The air outside a warehouse by differential pressure with the air in a warehouse in an air installation path (27) While the air installation way outside a warehouse (41) introduced into a warehouse inside fan's (10)'s upstream is prepared An end is casing (3). The air derivation way in a warehouse (42) which opening is carried out to a tooth-back plate (24), and the other end carries out opening to the evaporator room (20) of a warehouse inside fan's (10)'s direct downstream, and discharges the air in a warehouse in an evaporator room (20) outside a warehouse by differential pressure with the air outside a warehouse is prepared. The above-mentioned air installation way outside a warehouse (41) and the air derivation way in a warehouse (42) constitute a part of ventilation means (3a). And by the above-mentioned warehouse inside fan (10) To the air in a warehouse which returns from the above-mentioned warehouse inside air **** (25) through an air installation path (27) After the air outside a warehouse introduced through the above-mentioned air installation way outside a warehouse (41) was mixed, While a part is discharged outside a warehouse from the above-mentioned air derivation way in a warehouse (42) among the air in this mixed warehouse (mixed air) and ventilation of the air in a warehouse is made The air in a warehouse which remains is the above-mentioned evaporator (9). The 1st and 2nd air ducts (32) of the above and (36) after heat exchange was carried out It minds and is a container box (1) from a warehouse inside air port (26). It is made to feed inside.

[0030] And the above-mentioned air installation way outside a warehouse (41) and the air derivation way in a warehouse (42) Heat insulator (7) It minds and is housing (8). The pipe material made from FRP (43) to penetrate intervenes, and it comes to be constituted. In the inside-and-outside edge of each pipe material (43) of this cross-section circle configuration The 2nd punching plate (45) to which the 1st punching plate (44) which comes to puncture the pore of a large number with a diameter of about 3mm comes to puncture a toe side the pore of a large number with a diameter of about 10mm according to a convention of the TIR treaty which prevents smuggling etc. beforehand is attached in the heel side, respectively. And casing corresponding to the above-mentioned air installation way outside a warehouse (41), and the air derivation way in a warehouse (42) (1) To a tooth-back plate (24) this air installation way outside a warehouse (41) -- (-- warehouse outside (B) of pipe material (43)) Warehouse outside inlet (41a) which carries out opening from -- with the amount of air installation outside a warehouse introduced the air derivation way in a warehouse (42) -- (-- warehouse outside (B) of pipe material (43)) Warehouse outside exhaust port (42a) which carries out opening from -- a ventilation means (46) to ventilate the air in a warehouse by adjustment of a mutual amount with the air volume displacement in a warehouse discharged is constituted. Warehouse outside inlet of the above-mentioned air installation way outside a warehouse (41) (41a) And warehouse outside exhaust port of the air derivation way in a warehouse (42) (42a) Casing (1) In the upper edge abbreviation mid-position of a tooth-back plate (24), contiguity arrangement is carried out up and down. Moreover, as shown in drawing 4 thru/or drawing 7, the above-mentioned ventilation means (46) is casing (3). It has the slide lid (47) of the shape of a long and slender abbreviation rectangle in the vertical direction supported free [a slide in the vertical direction] at the external surface side of a tooth-back plate (24). Warehouse outside inlet of the air installation way outside the 2nd warehouse (41) located in the above-mentioned slide lid (47) at the bottom (41a) The pore which it makes the opening area adjustable open and close (47a), (47a) it prepares in the vertical direction abbreviation mid-position -- having -- **** -- slide migration in the vertical direction of this slide lid (47) -- warehouse outside inlet (41a) not only -- warehouse outside exhaust port (42a) of the above-mentioned air derivation way in a warehouse

(42) He is trying to make the opening area adjustable open and close.

[0031] As shown in drawing 1, moreover, in the right-and-left side of the above-mentioned slide lid (47) A warehouse inside fan (10) on either side and (10) And a motor (11) and (11) The service lid for performing easily the check according to right-and-left individual (48), (48) It is prepared. In service lid (48) (drawing of one of these to left-hand side) The face plate (49) which adjusts the mutual amount of the air volume displacement in a warehouse and the amount of air installation outside a warehouse with the slide movement magnitude of a slide lid (47), and enables a setup of the gas exchange of the air in a warehouse is attached. The gas exchange of the air in a warehouse is made to be set up by this face plate (49) suitably according to a graduation in the range of $150\text{m}^3 / \text{h}$ at the time of full open from $0\text{m}^3 / \text{h}$ at the time of a close by-pass bulb completely. Moreover, in the right-and-left flank of the above-mentioned slide lid (47), it is a piece of a flange (50), and (50). It is prepared and is this each piece of a flange (50), and (50). A long and slender slot (50a) and -- are prepared in the vertical direction in the vertical location. And each above-mentioned slot (50a) The screw hole (not shown) is established in the corresponding tooth-back plate (24). The above-mentioned slide lid (47) is each slot (50a). Butterfly bolt inserted in by minding (51), He is trying to be fixed to slide migration impossible to the external surface side of a tooth-back plate (24) by screwing to the screw hole by --.

[0032] and as a description part of this invention, as shown also in drawing 3, to the external surface side of the 2nd punching plate (45) in the above-mentioned air installation way outside a warehouse (41), and the air derivation way in a warehouse (42) Warehouse outside inlet (41a) (only one side is shown by a diagram) The ventilating-hole lid (52) as a board which reaches and carries out abbreviation coincidence with the cross-section configuration of a warehouse outside exhaust port (42a) is a screw (53) and (53). It is attached by the stop. Opening formed in the abbreviation center section of the above-mentioned ventilating-hole lid (52) in the shape of an abbreviation inverse triangle so that opening area might increase gradually toward the disconnection side of a slide lid (47) (52a) It is prepared. As shown in drawing 8, and the above-mentioned ventilation means (46) At the time of a small gas exchange with the small slide movement magnitude by the side of disconnection (upper part) of the above-mentioned slide lid (47), it is a warehouse outside inlet per slide movement magnitude (41a). And warehouse outside exhaust port (42a) The rate of increase of opening area is both made small. And at the time of a large gas exchange with the large slide movement magnitude by the side of disconnection of a slide lid (47), it is a warehouse outside inlet per slide movement magnitude (41a). And warehouse outside exhaust port (42a) It is set up so that the rate of increase of opening area may both be enlarged. It is made to ventilate so that it may not be contrary to the temperature conditions of the transportation object in a container box (1).

[0033] In addition, the above-mentioned warehouse outside unit (6) Container box then absorbed by the warehouse outside fan (13) (1) Heat exchange with the condenser (12) which serves as an elevated temperature with outer air is made.

[0034] Here, it is the above-mentioned container box (1). Although the case where inner transportation objects are garden stuff, such as a kiwi fruit, is described First, container box (1) So that ventilation by the ventilation means (46) may be performed maintaining inside at a low-temperature condition slide migration is carried out to a disconnection side from the closed position which shows a slide lid (47) to drawing 4 to the small gas exchange location of drawing 5 -- making -- warehouse outside inlet (41a) of the air installation way outside a warehouse (41) from -- with the amount of air installation outside a warehouse introduced warehouse outside exhaust port (42a) of the air derivation way in a warehouse (42) from -- the air in a warehouse is ventilated by adjustment of a mutual amount with the air volume displacement in a warehouse discharged. As slide movement magnitude by the side of disconnection of this slide lid (47) Since kiwi fruits are the conditions which set a gas exchange as $20\text{m}^3 / \text{h}$ for whenever [warehouse internal temperature] by 0 times Centigrade, according to the graduation of a face plate (49), slide migration of the slide lid (47) is carried out to a disconnection side to $20\text{m}^3 / \text{h}$. In this condition The piece of a flange (50) of right and left of a slide lid (47), and (50) Each slot (50a) Butterfly bolt minded and inserted in

(51), It fixes to slide migration possible to the external surface side of booth-back plate (24) by screwing to the screw hole by (53). Thereby, it is the warehouse outside inlet (41a) of the air installation way outside a warehouse (41). Screw (53), (53) Opening of the ventilating-hole lid (52) which carried out the stop (52a) The part (lower limit section of an abbreviation inverse triangle) by the side of anti-slide disconnection of a slide lid (47) is a pore (47a) of a slide lid (47) top. It minds and is a warehouse outside (B). Opening is carried out. Opening of this ventilating-hole lid (52) (52a) The air outside a warehouse is introduced in an air installation path (27) through a part by differential pressure with the air in a warehouse. And the air outside a warehouse with the high humidity introduced from this air installation way outside a warehouse (41) After the air in a warehouse which returns from warehouse inside air **** (25) through an air installation path (27) by the warehouse inside fan (10) was mixed, The part among the air in this mixed warehouse (mixed air) is a warehouse outside (B) from the air derivation way in a warehouse (42). While being discharged the air in a warehouse which remains -- evaporator (9) it minds and cools to 0 times Centigrade -- having -- after an appropriate time, the 1st and 2nd air ducts (32), and (36) minding -- a warehouse inside air port (26) to container box (1) By making it feed inside Container box (1) Humidification ventilation will be carried out the inner air in a warehouse always being cooled.

[0035] And the refrigerating capacity of a refrigerant circuit is controlled so that the air in a warehouse becomes whenever [warehouse inside installation constant temperature], and it is a container box (1) by this air in a warehouse (mixed air). Inner temperature will always be maintained at the low-temperature condition of 0 times Centigrade according to garden stuff (transportation object).

[0036] Thus, container box (1) When inner transportation objects are garden stuff, such as a kiwi fruit which requires that a gas exchange should be set as $20\text{m}^3 / \text{h}$, holding whenever [warehouse internal temperature] to 0 times Centigrade The slide lid (47) of a ventilation means (46) fixes the slide movement magnitude by the side of disconnection to $20\text{m}^3 / \text{h}$ according to the graduation of a face plate (49), and is a warehouse outside inlet (41a). And warehouse outside exhaust port (42a) He carries out opening small and is trying to make it correspond to a small gas exchange.

[0037] in that case, warehouse outside inlet (41a) by which opening is carried out with a slide lid (47) And warehouse outside exhaust port (42a) this warehouse outside inlet (41a) And warehouse outside exhaust port (42a) Opening (52a) of the ventilating-hole lid (52) which goes to the disconnection side of the slide lid (47) attached in the 2nd punching plate (45) and which is boiled, and it follows and opening area increases gradually The warehouse outside inlet (41a) and warehouse outside exhaust port (42a) per slide movement magnitude of a slide lid (47) at the time of the small gas exchange from which a gas exchange serves as $20\text{m}^3 / \text{h}$ grade Since it is set up so that both the rate of increase of opening area may become small, as a continuous line shows to drawing 8 The slide lid which it was made for the gas exchange property over the slide movement magnitude of a slide lid to be located within a small gas exchange, and carried out slide movement magnitude small to the disconnection side at the time of a small gas exchange (47), Warehouse outside exhaust port (42a) The warehouse inside which sets and carries out opening (A) Warehouse outside exhaust port aslant discharged as **** in a through tube (42a) While the air volume displacement in a warehouse from between is stopped few The differential pressure between the air in a warehouse of the warehouse inside fan (10) upstream and the air outside a warehouse is also stopped small, and they are a slide lid (47) and a warehouse outside inlet (41a). The amount of air installation outside a warehouse from between also decreases naturally. The temperature of the mixed air of the air in a warehouse and the air outside a warehouse being continuously adjusted by the refrigerating capacity control means (59) according to the output of the temperature sensor (54) which detected the temperature, and maintaining a low-temperature condition at the bottom of a small gas exchange condition Transportation to the remote place by the container of garden stuff, such as a kiwi, will be made smoothly.

[0038] moreover -- like the above -- warehouse outside inlet (41a) And warehouse outside exhaust port (42a) Opening (52a) of the ventilating-hole lid (52) which goes to the disconnection side of the

slide lid (47) of the attached 2nd punching plate (45) and which is boiled and it follows and opening area increases gradually Warehouse outside inlet per slide movement magnitude of the slide lid at the time of a large gas exchange (47) (41a) And warehouse outside exhaust port (42a) Since it is set up so that both the rate of increase of opening area may become large When it is the bulb which requires that a gas exchange should be set up greatly, the transportation object in a container box (1) holding whenever [warehouse internal temperature] to 18-degree about Centigrade, a slide lid (47) It is a warehouse outside inlet (41a) in the large gas exchange location which enlarges slide movement magnitude by the side of disconnection. And by carrying out opening of the warehouse outside exhaust port (42a) greatly, and making it correspond to a large gas exchange It is made for the gas exchange property over the slide movement magnitude of a slide lid (47) to be located within a large gas exchange, as a continuous line shows to drawing 8 . warehouse outside exhaust port (42a) which carries out opening with the slide lid (47) which carried out slide movement magnitude greatly to the disconnection side from, while the air volume displacement in a warehouse increases A slide lid (47) and warehouse outside inlet (41a) The amount of air installation outside a warehouse from between also increases naturally. Transportation to the remote place by containers, such as a bulb, will be made smoothly, being continuously adjusted by the refrigerating capacity control means (59) according to the output of the temperature sensor (54) which detected the temperature of the mixed air of the air in a warehouse, and the air outside a warehouse under the large gas exchange condition, and maintaining a low-temperature condition.

[0039] Thereby, it is a container box (1). By carrying out slide migration of the slide lid (47) of a ventilation means (46) according to an inner transportation object Warehouse outside inlet per slide movement magnitude of the slide lid at the time of a small gas exchange (47) (41a) And warehouse outside exhaust port (42a) While both making the rate of increase of opening area small Warehouse outside inlet per slide movement magnitude of the slide lid at the time of a large gas exchange (47) (41a) And warehouse outside exhaust port (42a) It is set up so that the rate of increase of opening area may both be enlarged. Warehouse outside inlet according [as the gas exchange property over the slide movement magnitude of a slide lid shows drawing 8 as a continuous line, a linear will be approached, and] to slide migration of a slide lid (47) (41a) And opening adjustment of a warehouse outside exhaust port (42a) can be performed smoothly. And freezer by gas exchange increase in spite of being at the small gas exchange time (2) Frost is prevented and it is a freezer (2). The fall of refrigerating capacity can be prevented.

[0040] Moreover, a setup of the rate of increase of the opening area per slide movement magnitude by the side of disconnection of the slide lid (47) by the ventilation means (46) Warehouse outside inlet (41a) And warehouse outside exhaust port (42a) Opening of the ventilating-hole lid (52) attached, respectively (52a) Only by adding a ventilating-hole lid (52) by being carried out with a configuration A slide lid can be diverted to the existing warehouse outside inlet and a warehouse outside exhaust port list, a ventilation means (46) can be constituted, and a cheap ventilation means (46) can be offered.

[0041] Furthermore, like the above, it can apply also to the existing freezer for containers easily from the ventilation means (46) being constituted by addition of a ventilating-hole lid (52), and versatility of the ventilation means (46) against the existing freezer for containers can be planned.

[0042] And opening of the above-mentioned ventilating-hole lid (52) (52a) It is opening (52a) of a ventilating-hole lid (52) by being formed in the shape of an abbreviation inverse triangle so that opening area may increase gradually as a configuration goes a slide lid (47) to a disconnection side. It is formed simply and easily and a ventilation means (46) can be constituted simply and easily.

[0043] In addition, this invention is not limited to the above-mentioned example, and includes various modifications. for example, the above-mentioned example -- warehouse outside inlet (41a) And warehouse outside exhaust port (42a) Opening (52a) of the ventilating-hole lid (52) attached in the 2nd punching plate (45) the slide migration by the side of disconnection of a slide lid (47) -- warehouse outside inlet (41a) from -- the amount of air installation outside a warehouse, and warehouse outside exhaust port (42a) from, although a ventilation means (46) to adjust the air

volume displacement in a war use mutually was constituted A ventil means forms the cross-section configuration of the pipe material itself in the shape of an abbreviation inverse triangle, and may be made to be constituted.

[0044] Moreover, at the above-mentioned example, it is opening (52a) of a ventilating-hole lid (52). Although the configuration was formed in the shape of an abbreviation inverse triangle As shown in drawing 12 , it is opening (61a) of a ventilating-hole lid (61). A configuration As the configuration of the anti-disconnection side abbreviation one half section of a slide lid (47) is formed, and the configuration of the disconnection side abbreviation one half section of a slide lid (47) is formed in an abbreviation semicircle arc configuration in the shape of an abbreviation inverse triangle, respectively or it is shown in drawing 13 Opening of a ventilating-hole lid (62) (62a) A configuration so that the configuration of the disconnection side abbreviation one half section of a slide lid (47) may be formed in an abbreviation semicircle arc configuration It is made to be formed in the leaf shape of a ginkgo nut, or the configuration of opening of a ventilating-hole lid may form in a sector so that the configuration of the disconnection side abbreviation one half section of a slide lid (47) may be formed in an abbreviation semicircle arc configuration. In short The configuration of the anti-disconnection side abbreviation one half section of a slide lid should just be formed for the configuration of opening of a ventilating-hole lid in the shape of an abbreviation inverse triangle at least. Moreover, that it may be formed in the configuration which combined the shape of an abbreviation inverse triangle and an abbreviation semicircle arc configuration, or you may be formed in the leaf shape and sector of a ginkgo nut has the natural cross-section configuration of the pipe material itself like the above.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the rear view of the freezer which looked at near the slide lid from the warehouse outside.

[Drawing 2] It is the vertical section side elevation of the tooth-back plate in the condition of having cut the slide lid a warehouse outside inlet and near the warehouse outside exhaust port.

[Drawing 3] It is the front view of a ventilating-hole lid.

[Drawing 4] It is the drawing 1 equivalent Fig. showing a close-by-pass-bulb-completely condition with a slide lid.

[Drawing 5] It is the drawing 1 equivalent Fig. showing a small gas exchange condition with a slide lid.

[Drawing 6] It is the drawing 1 equivalent Fig. showing a large gas exchange condition with a slide lid.

[Drawing 7] It is the drawing 1 equivalent Fig. showing a full open condition with a slide lid.

[Drawing 8] It is the property Fig. showing the gas exchange property over the slide movement magnitude of a slide lid.

[Drawing 9] It is the rear view of the freezer seen from the warehouse outside.

[Drawing 10] It is a sectional view in the A-A line of drawing 11 .

[Drawing 11] It is the vertical section front view of the container box in the condition of having demounted the front board.

[Drawing 12] It is the drawing 3 equivalent Fig. concerning a modification.

[Drawing 13] It is the drawing 3 equivalent Fig. concerning a modification.

[Description of Notations]

- (1) Container box
- (2) Freezer
- (3) Casing
- (3a) Air duct
- (10) Warehouse inside fan
- (20) Front board (inside plate)
- (24) Tooth-back plate (outside plate)
- (25) Warehouse inside air ****
- (26) Warehouse inside air port
- (41) The air installation way outside a warehouse
- (41a) Warehouse outside inlet
- (42) The air derivation way in a warehouse
- (42a) Warehouse outside exhaust port
- (46) Ventilation means
- (47) Slide lid
- (52) (61) (62) Ventilating-hole lid (board)

(52a) (61a) (62a) Opening

[Translation done.]

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